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confined to our colleges but is now pursued by thousands of students in special and ordinary secondary and elementary schools. And this movement is rapidly growing. Our adult farmers are so desirous of securing the information which our agricultural institutions have to give that many millions of copies of department and college and station publications are annually distributed, the farmer's institutes last year had an attendance of over 3,000,000, and a comprehensive system of agricultural extension service is rapidly covering the whole United States. And now has come this new union of the national and state and local forces for the dissemination throughout our vast territory in a practical way of whatever knowledge our research and educational agencies have accumulated or will gather in the future. And this comes at a time when all classes of our people, in both city and country, are alive as never before to the fundamental importance of our agricultural industries and the absolute necessity of having contentment and permanency in our rural communities.

All will acknowledge that the national and state institutions represented in this association have individually and collectively rendered service of great value to the republic in the past thirty years. But who will venture to set the limits of their achievements in the next thirty years? Certainly the program which they have set for themselves should be a great inspiration to all who serve in their ranks. They have defined agricultural research and education in terms broad enough to take in the multitudinous variety of production in agricultural regions which stretch from the arctic circle to near the equator, as well as a wide range of economic and social problems connected with the business of farming, the life of the farm home and the activities of the rural communities. The extent and variety of the subject-matter to be studied and taught would in themselves be powerful incitements to strenuous intellectual endeavors. When to these are added the vast extent of our territory and the tremendous number of our people the human interests involved

make a powerful appeal to our emotions. And finally the complicated administrative machinery which we are developing for this agricultural service, in harmony with the American interlocking system of national, state and local jurisdictions, will require the exercise on a grand scale of combined energy and self-restraint which are the most marked characteristics of the will power of the modern civilized man. If what we call cooperation, fraternalism, or any other name designating united, harmonious and effective activity of groups of people, is to be the governing principle of community, national and international life in the years to come, it may have the finest exemplification in the activities of the institutions represented in this association. And this as I understand it is the example which we are proposing to show to the world. The very difficulties of the scheme are alluring to us and the more we imbibe the spirit of this undertaking the more we are convinced that we can make it a success.

A. C. TRUE

*INTERGLACIAL MAN FROM EHRINGSDORF
NEAR WEIMAR*

THE attention of prehistoric archeologists has long been turned toward the region of Weimar, Germany, because of important discoveries made at Taubach and Ehringsdorf, both in the Ilm Valley. Known since 1871, the station of Taubach (back of the village of that name) was systematically explored between 1876 and 1880. The deposits at Taubach and Ehringsdorf are alike. Their basis is a layer of sand and gravel dating from the third or Riss glacial epoch (Obermaier). Above this is lower travertine with remains of the mammoth and woolly rhinoceros near the bottom, and those of *Elephas antiquus* and *Rhinoceros merckii*, both witnesses of a warm climate, near the top. Next above at Ehringsdorf comes the so-called "Pariser" (corruption from Poröser) deposit, a sort of loess. Higher still is a deposit of upper travertine with remains of the stag and woolly rhinoceros; curiously enough the *Rhinoceros merckii* also occurs at this level.

The human remains in question, consisting of a nearly complete human lower jaw, form the subject of a paper just published by Professor G. Schwalbe¹ of Strassburg. Professor Hans Virchow was to have given a demonstration of the specimen before the German Congress of Anthropology at Hildesheim last August, but the congress was not held on account of the war. The discovery was first brought to my attention through a letter from Dr. L. Pfeiffer, of Weimar, under date of July 20, 1914. Like much of the archeological material previously found at Taubach and Ehringsdorf this lower jaw is now the property of the museum at Weimar. Because of its double association with that city, Schwalbe proposes to call it the Weimar lower jaw.

The lower jaw was found on May 8, 1914, at a depth of 11.9 m. below the surface in the lower travertine, 2.9 m. below the so-called Pariser loess. It is from the Kämpfe quarry at Ehringsdorf and was brought to light by means of a blast. Under the circumstances it was fortunate indeed that the lower jaw suffered no worse. All the teeth are intact and in situ save the two right incisors (in their place is a small mass of travertine containing a univalve shell). Both halves of the body are practically complete. The right ascending ramus is in part present; although not enough remains to save the mandibular angle, the coronoid and condyloid processes, and the mandibular or sigmoid notch. The left ascending ramus is completely gone.

A number of remarkable features are combined in the Weimar lower jaw. The absence of a chin is doubly emphasized because of the pronounced alveolar prognathism as shown in the figures, a condition not found in the lower jaws of Krapina and La Chapelle-aux-Saints, nor even in that of *Homo heidelbergensis*. Closely related to the alveolar prognathism is the sloping nature of the inner surface of the jaw in the region of the symphysis, region called by Schwalbe planum alveolare. In all other lower jaws of the Neandertal type a

median line in this field is much more nearly vertical. Below this planum alveolare is a spinous area but no distinct spines for the attachment of the genioglossal and geniohyoid muscles. Neither is there the customary ridge on the inner surface of each corpus for the attachment of the mylohyoid muscles. The absence of this mylohyoid ridge is even more marked than in the well-known mandibles of the Neandertal type.

The foramen mentale is unusually large. It is directly beneath the first molar (similar to the situation in *Homo primigenius*); while in recent man this foramen is located farther forward beneath the second premolar. In the Heidelberg lower jaw it is also large but situated further forward than in the specimen from Weimar.

Schwalbe lays special stress on the narrowness of the arch of the Weimar jaw. The breadth between the inner faces of the third molars is 48 mm.; the distance from posterior surface of the third molar to the anterior margin of the median incisor is 69 mm. The index derived from these two measures in the chimpanzee is 54.6. In the Weimar jaw this index is 69.5; while it is much larger in other known fossil human lower jaws: Heidelberg 75.7, Krapina 80 and La Chapelle 100. Schwalbe admits however that the low index of the Weimar jaw might be due in part at least to post-mortem deformation.

The teeth are much worn. Since the premolars are less worn than the canines, one is led to conclude that the points of the canines stood above the level of the premolars. There is no diastema between the canines and the first premolars. A notable feature is the relative smallness of the third molars. This unexpected condition proves that the tendency of the third molars to disappear is of much more ancient origin than other known jaws of the Neandertal and earlier types have led us to suppose.

Without hesitation Schwalbe places the Weimar lower jaw in the Neandertal group, for which group he proposed some years ago the name *Homo primigenius*. In the preliminary paper he does not describe the cul-

¹ "Über einen bei Ehringsdorf in der Nähe von Weimar gefundenen Unterkiefer des *Homo primigenius*," *Anat. Anzeiger*, Band 47, 337-345, 1914.

tural remains found at the same level. He does however mention some of the numerous accompanying fauna: *Rhinoceros merckii*, stag, horse, ox and cave bear. There was also an abundance of charcoal and flint implements, the latter for the most part apparently retouched points and scrapers.

Two human teeth (one of a child and one of an adult) had already been found in the lower travertine of Taubach. During the summer of 1908, Dr. Pfeiffer found human skull fragments in the same deposit at Ehringsdorf.

Both Obermaier and Schmidt consider the lower travertine of Ehringsdorf (the deposit in which the lower jaw was recently found) and Taubach to be older than Mousterian. Although it contains no typical coups de poings, on account of the character of the fauna as well as the industry, Obermaier would call the deposit of Chellean age. For Schmidt, who has recently published examples of the industry, it is Acheulian.

In any case all are evidently agreed that the deposit belongs to the Riss-Würm interglacial epoch. In that case according to one school it might be Chellean, Acheulian, or early Mousterian; according to the school of Penck, it would have to be later Mousterian, since he places early Mousterian during the Riss glacial epoch and the Chellean-Acheulian during the second or Mindel-Riss interglacial epoch.

Whichever view is correct, on account of its anatomical characters, as well as the position of the deposit and the nature of the associated cultural and faunal remains, the anthropologist may justly claim for the Weimar lower jaw an antiquity surpassed perhaps only by the skull of Piltown and the Mauer (*Homo heidelbergensis*) lower jaw.

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THE CHICAGO MEETING OF THE NATIONAL ACADEMY OF SCIENCES

THE National Academy of Sciences will meet December 7, 8 and 9 at the University of Chicago. Social headquarters will be at

the Quadrangle Club, 58th Street and University Avenue, where the members will meet for the first time December 7, 1:00 P.M., for luncheon. A feature of the meeting will be the second course of William Ellery Hale lectures on evolution, two lectures by Professor William Wallace Campbell, director of the Lick Observatory, on Stellar Evolution and the Formation of the Earth. These lectures and four sessions with papers by members of the academy and others will be open to the public.

The council will meet at 4:30 P.M., December 7, at the Quadrangle Club.

A preliminary program of the scientific papers is as follows:

I. Mathematics

GILBERT AMES BLISS: *A Generalization of a Theorem of Gauss Concerning Geodesic Triangles.*

If a line OA of unit length is parallel to the normal at a point a of a surface S , then A may be regarded as the image of a on the unit sphere with center at O . It is a theorem due to Gauss that the difference between π and the sum of the angles of a geodesic triangle on the surface is numerically equal to the area of the image of the triangle when each point is mapped on the sphere as above described. The paper is concerned with a generalization of this theorem. The magnitudes involved in the statement of the theorem, angles, the equations of the geodesic lines, the area of the image of the triangle, are expressible in terms of invariants associated with the integral of length on the surface S . For a more general integral of the calculus of variations some of the analogous invariants have been found by the author and other writers. In the present paper the remaining invariants are described, and a theorem corresponding to that of Gauss is deduced.

LEONARD E. DICKSON: *Recent Progress in the Theories of Modular and Formal Invariants.*

Contrast between algebraic and modular invariants. Formal invariants and their construction. Modular plane curves for modulus 2.

G. A. MILLER: *The ϕ -subgroup of a Group of finite order.*

In 1885 Frattini introduced the ϕ -subgroup of a finite group G as the characteristic subgroup whose individual operators enter into no set of